

Nanostructured Super-Black Optical Materials, Phase II

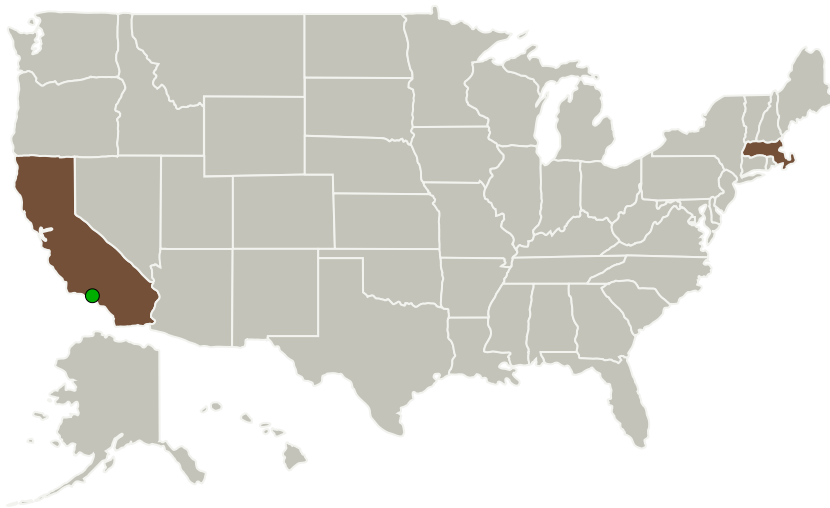
Completed Technology Project (2013 - 2015)



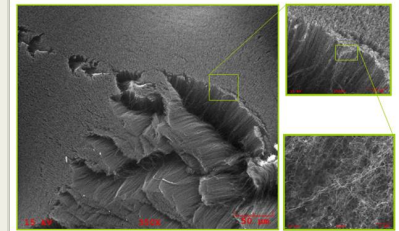
Project Introduction

Need: NASA faces challenges in imaging and characterizing faint astrophysical objects within the glare of brighter stellar sources. Achieving a very low background requires control of both scattered and diffracted light. Significance of the Innovation: Aligned arrays of carbon nanotubes have recently been recognized as having world-leading optical absorption, far above competing state of the art materials. The nanotube array's diffuse reflectance (10^{-7}) was demonstrated at two orders of magnitude lower than commercially available low reflectance carbons (10^{-5}). The integrated total reflectance 0.045%, bested the field of competing materials, which are typically $>1\%$ at optical wavelengths. However, these arrays were produced on silicon, so they have limited utility for aerospace applications. NanoLab identified the potential to grow these arrays on flexible substrates, and proposed a Phase I effort to explore their properties.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Nanolab, Inc	Lead Organization	Industry	Waltham, Massachusetts
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California



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Primary U.S. Work Locations

California

Massachusetts

Project Transitions



July 2013: Project Start

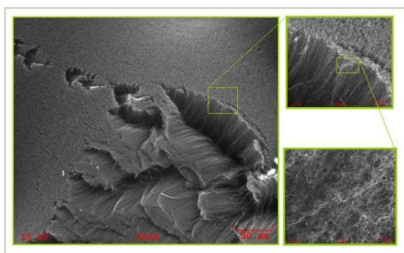


July 2015: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/137325>)

Images



Project Image

Nanostructured Super-Black Optical Materials

(<https://techport.nasa.gov/image/132949>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Nanolab, Inc

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

David L Carnahan

Co-Investigator:

David Carnahan

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Technology Maturity (TRL)

Start: **3**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.3 Optical Components

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System